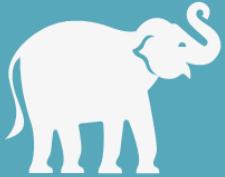


PHOTO COURTESY OF OREGON ZOO



## The EEHV Consortium at National Elephant Herpesvirus Laboratory **Update**



# 2<sup>nd</sup> Biannual EEHV Advisory Group Meeting

**Atlanta, GA July 23, 2016**

The EEHV Advisory Group met in Atlanta, GA, the Saturday following the joint AAZV/EAZVV conference in July 2016. This was the second meeting of the Advisory Group since its inception in 2014. Attendees included 13 Advisory Group members and 18 invited guests representing 6 countries total, including veterinarians, researchers, and elephant management specialists. The meeting agenda included regional updates from North America, Europe, and Asia, potential new diagnostic options for screening at risk calves, evaluation of shedding during elephant transfer, and the updating of two documents (*Standards of Care for Elephant Calves as related to EEHV* and *EEHV Monitoring and Diagnostic Testing*).

Other topics discussed included EEHV as it relates to African elephants, and the structure of the Advisory Group and the need to update and change it, based on the

enormous growth in our international EEHV community over the past 2 years. Endorsement of research projects was also discussed, as well as the overhaul of the eehvinfo.org website.

The complete [meeting report](#) of the EEHV Advisory Group, as well as the [updated documents](#) on *Standards of Care for Elephant Calves* and *Monitoring and Testing* for both Asian and African elephants, are available on the eehvinfo.org website. Please note that you will need the password to access the updated documents; you can request the password on the website.



**CONTINUED ON PAGE 2**

## USEFUL LINKS FOR EEHV PREPARATION

[EEHV  
PLANNING  
PROTOCOLS](#)

[EEHV TESTING  
LABORATORIES](#)

[AGENDA AND  
ATTENDEES OF THE  
EEHV ADVISORY  
GROUP MEETING  
2016.](#)



## CONTINUED FROM PAGE 1

The EEHV Advisory Group would like to acknowledge their generous sponsors, without whom this critical meeting would not have taken place:



## EEHV Happenings In Asia

The Asia EEHV Working Group met for the second time, the day after the 15th International Elephant & Rhino Conservation and Research Symposium at the Singapore Zoo. In attendance were over 25 elephant veterinarians, researchers, pathologists, managers, conservation specialists, and university professors from ten countries. On the agenda were range country reports of EEHV cases; updates from the North American, European, Thai, and Asian EEHV groups; voting on EEHV priorities; the *EEHV in Asia* brochure; and planning for an EEHV training workshop (see p4 of this newsletter for a few details about the training workshop). The *EEHV in Asia* brochure can be found [here](#); the meeting report will be added when it is completed.



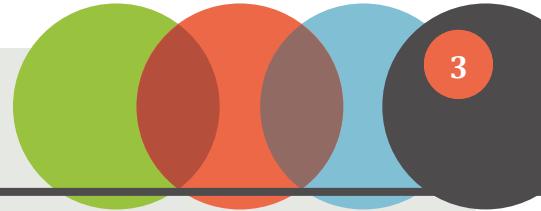
## Upcoming EEHV meeting at the ZSL London zoo, London, UK on May 15-17, 2017

The international elephant caring community (keepers, researchers and veterinarians) congregates once every two years to exchange ideas on control of these devastating elephant viruses. The next EEHV workshop will be hosted and organized by the Zoological Society of London (ZSL) and the Animal and Plant Health Agency (APHA). The venue is at the ZSL London Zoo, and the practical aspect of the workshop will be carried out at the ZSL Whipsnade Zoo.

Information on registration, abstract submission and accommodation can be found [here](#). Please register at your earliest convenience, as places are limited. Please also note that the deadline for the abstract submission was 1<sup>st</sup> April 2017.

For queries on registration and accommodation please contact:  
Emma Heskett via +44(0) 20 7449 6245 or [emma.heskett@zsl.org](mailto:emma.heskett@zsl.org)

For abstract related queries, please contact:  
Akbar Dastjerdi at [akbar.dastjerdi@apha.gsi.gov.uk](mailto:akbar.dastjerdi@apha.gsi.gov.uk).



## RECENT EEHV PUBLICATIONS

Ling, P.D., Long, S.Y., Fuery, A., Peng, R.S., Heaggans S.Y., Qin, X., Worley, K.C., Duggan S., and G.S. Hayward. 2016. Complete Genome Sequence of Elephant Endotheliotropic Herpesvirus 4 (EEHV4): The first example of a GC-rich branch Proboscivirus. *mSphere* 1(3):e00081-15.

Pursell, T., and Paul D. Ling. 2016. Generation and validation of new quantitative polymerase chain reaction assays to detect elephant endotheliotropic herpesvirus 1A, 1B, and 4. *J. Virological Methods* 237:138-142.

Rebecca Kendall, Lauren Howard, Nic Masters, and Robyn Grant, 2016. The Impact of Elephant Endotheliotropic Herpesvirus on the Captive Asian Elephant (*Elephas Maximus*) Population of the United Kingdom and Ireland (1995–2013). *Journal of Zoo and Wildlife Medicine* 47(2): 405-18.



Photo Courtesy of Oregon Zoo

## THANK YOU

### MEMBERSHIP HELPS TO PREVENT ELEPHANT DEATHS

- THE BRONX ZOO
- THE BUFFALO ZOO
- BUSCH GARDENS TAMPA
- THE CLEVELAND METROPARKS ZOO
- COLUMBUS ZOO AND AQUARIUM
- THE DALLAS ZOO
- DICKERSON PARK ZOO
- FORT WORTH ZOO
- HAVE TRUNK WILL TRAVEL
- THE HOUSTON ZOO
- JACKSONVILLE ZOO & GARDENS
- MARYLAND ZOO
- OKLAHOMA CITY ZOO AND BOTANICAL GARDENS
- THE OREGON ZOO
- POINT DEFiance ZOO & AQUARIUM
- RINGLING BROS. AND BARNUM & BAILEY
- THE ROSAMOND GIFFORD ZOO AT BURNET PARK
- SAINT LOUIS ZOO
- SMITHSONIAN'S NATIONAL ZOO  
AND CONSERVATION BIOLOGY INSTITUTE
- THE TULSA ZOO
- UTAH'S HOGLE ZOO



# 2016 ACTIVITIES OF THE NEHL

BY ERIN LATIMER

Over the last calendar year, the NEHL tested 1208 samples, from 369 shipments from elephant-holding facilities. Most of these shipments were from EEEHV Consortium members and most of the samples were for routine testing, either whole bloods from calves that we monitor weekly for early detection of viremia or trunk wash samples that we screen for EEEHV shedding.

## 2016 EEEHV deaths

Sadly, we had two deaths from EEEHV in 2016, both from EEEHV1A. The first was in a male calf 2.5 years old housed with adult females. He was first identified with a non-specific lameness and samples were submitted for EEEHV. The second day, treatment with famcyclovir was initiated; however, he succumbed early the next morning with lesions typical for EEEHV. His blood viral load was determined from the sample obtained on the second day of symptoms and was over 17 million VGE/ml.

The second calf was identified with a low viral load (700 vge/ml) on routine weekly screening; he was housed with adult elephants. Treatment was initiated the next day when the initial low viral load was reported; he had no symptoms until the fifth day of treatment (a subtle edema in one front leg). Viral load that day was 900,000 vge/ml. He subsequently was administered fresh harvested plasma on two days, and platelets on the ninth day of treatment. His plasma protein levels declined throughout the treatment, but platelet levels and clotting time were within normal limits until the ninth day of treatment. His viral load peaked on the 7<sup>th</sup> day of treatment at over 3 million vge/ml, (when typical symptoms of EEEHV were identified) and was at 2.5 million vge/ml on the 8<sup>th</sup> day of treatment. He succumbed suddenly on the morning of his tenth

day of treatment. Even though treatment was initiated early in the course of the disease, he succumbed to the damage caused to his vital organs before the levels peaked.

*(Information on these two cases provided by the attending veterinarian on each case.)*

## EEHV viremias

We also had a calf that was being monitored weekly that had two separate EEEHV viremias, the first from EEEHV1B and the second about seven months later due to EEEHV1A. We don't have as much quantitative data on the first viremia, as the calf was just being trained for venipuncture; we picked up the tail-end of the viremia, which was followed by fairly high shedding of viral DNA in the trunk secretions. The calf received intermittent doses of famciclovir rectally, IV plasma once and mesenchymal stem cells twice (once IM and once IV). The treatments were given due to a small rise in viremia levels. The calf had to be sedated fairly frequently to get the blood samples, so the zoo staff administered treatment opportunistically while waiting to hear if the viral levels were increasing.

The second episode was very similar to the first, although full treatment was instituted early on because viremia numbers increased 10-fold within the first few days of testing. The calf received ganciclovir, rectal famciclovir, IV mesenchymal stem cells, IV enrofloxacin, IM ceftiofur CFA, IM banamine along with rectal fluids. She was treated for four days until zoo staff was confident the viremia had stabilized. Although clinical signs were not seen with either episode, the viral levels seen with the second episode were above the level (5,000 – 10,000 vge/ml) at which clinical signs tend to appear. Happily, the calf came through both episodes and continues to do well. *(Information on this calf provided by the attending veterinarian.)*



There were also several instances of very low level, sporadic detections of EEHV1 and EEHV5 in some of the US calves that the lab monitors weekly, none of which lasted longer than a week or two. These may correlate to a primary infection that was quickly handled by the calf or to a transient recrudescence in the blood.

#### Outreach and communication

A review of EEHV was published in the ILAR Journal with colleagues Simon Long and Gary Hayward from Johns Hopkins University. [Check it out](#) for some up-to-date information on the history, epidemiology, and genetics, as well as other EEHV topics.

The NEHL was able to host 3 interns in 2016; one was a new BS graduate who is now in Myanmar on a Fulbright Teaching assistantship, teaching students English, biology, and elephant conservation. A 2<sup>nd</sup> year Tufts vet student trained in the lab in DC, then went to Ireland for the summer to help the Irish Equine Centre set up EEHV testing for the Dublin Zoo. The third intern was a GRIP intern (PhD student at Oregon State U) who trained in the DC lab and did an EEHV prevalence project in Nepal.

I helped organize (with Lauren Howard, Debbie Olson, and Kay Backues) and attended the EEEHV Advisory Group meeting in Atlanta in July 2016; see the summary of the meeting on p. 1 of this newsletter, with documents and pictures on the [eehvinfo.org](http://eehvinfo.org) website. I also attended the 2<sup>nd</sup> Asia EEEHV Working Group meeting in Singapore in November 2016; see the summary of this meeting on p. 2 of this newsletter. A major topic of discussion at the Singapore meeting was the need for increased EEHV testing capacity in the Asian range countries. I have been working with several colleagues planning training workshops in Thailand and other Asian countries, to occur in late 2017 and early 2018. We aim to provide training, reagents, and some equipment for EEHV molecular diagnostics to colleagues in up to eight range countries. We have secured partial funding from Asian Elephant Support and Wildlife Reserves Singapore and are lining up the remaining funding now.



PHOTO COURTESY OF Graham S. Jones,  
Columbus Zoo and Aquarium